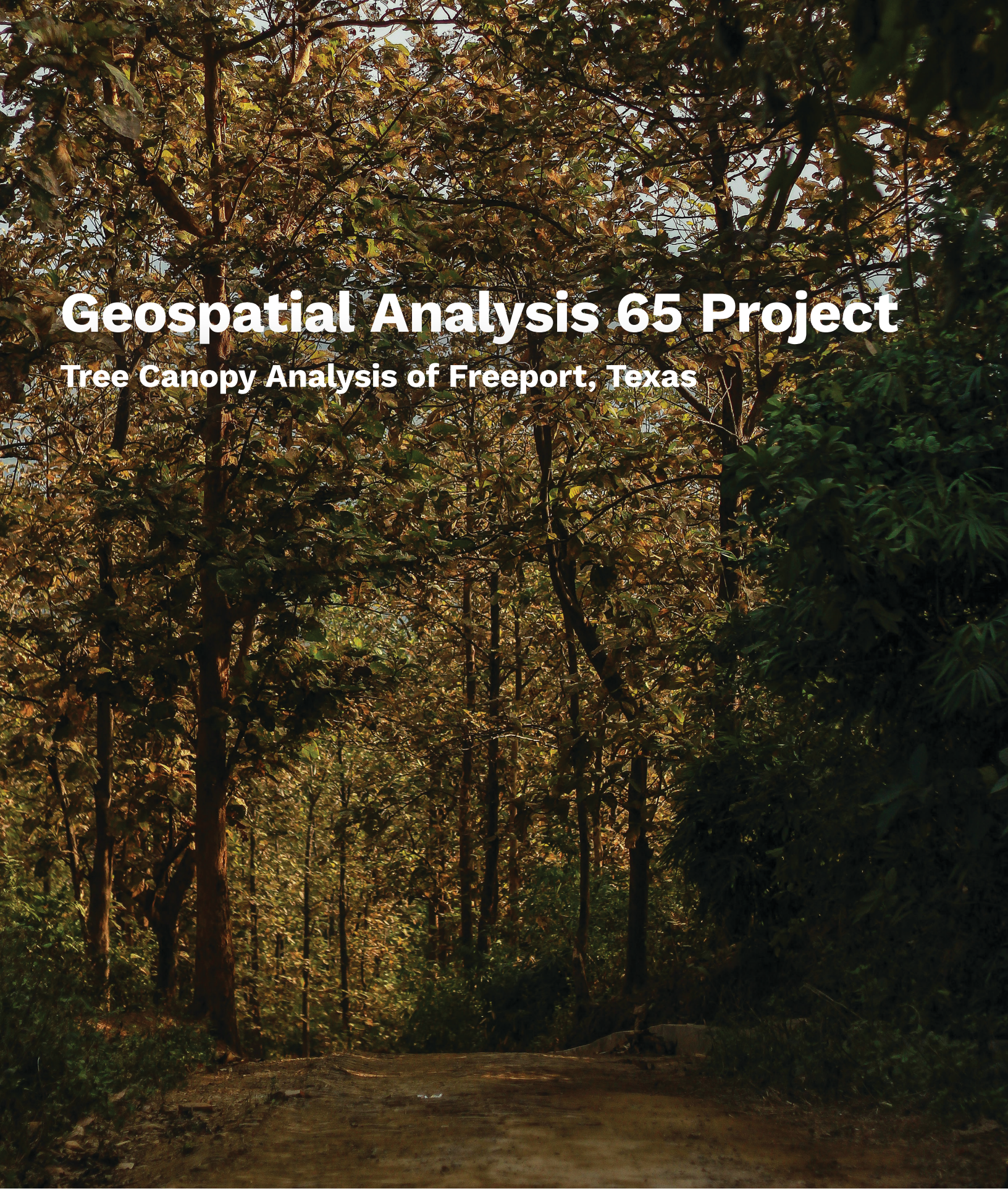


Geospatial Analysis 65 Project

Tree Canopy Analysis of Freeport, Texas

TEXAS A&M FOREST SERVICE 1915

TEXAS TREES FOUNDATION

TEXAS TREES FOUNDATION

Contents

Introduction

"Forests are the lungs of our land, purifying the air and giving fresh strength to our people" – Franklin D. Roosevelt

Cities across Texas and the nation are increasingly viewing their urban forests as vital infrastructure. Unlike traditional infrastructure that degrades with age, a well-managed urban forest grows more valuable over time, offering expanded benefits such as cleaner air, cooler temperatures, and stronger communities. As cities compete for talent, investment, and livability rankings, those that prioritize green infrastructure are setting themselves apart. Forward-thinking municipalities are now racing to implement data-driven tree strategies, not just to beautify streets, but to build resilience, quality of life, and long-term economic vitality.

The Geospatial Analysis 65 project is a tool for securing these benefits for your community. It provides step-by-step guides and customized maps and information to inform and support your community in planting trees where they'll be most impactful to the community. Whether you are brand new to urban forestry or looking to grow an existing program, the information here can help guide you to a greener future. This report is also an invitation to invest in your community and be part of something bigger: a statewide partnership that's extending the benefits of trees to all Texans.

Geospatial Analysis 65 is a statewide initiative to help Texas cities with the highest need to grow greener, healthier, and more resilient through increasing their urban forest canopy. It is a partnership between the Texas A&M Forest Service (TFS) and the Texas Trees Foundation (TTF), with support from PlanIT Geo. By combining advanced mapping technology with local insight, this initiative identifies the places with the greatest need of expanding their tree canopy and provides a clear path forward for action.

Trees are our oldest friends on earth and our most powerful and profound hope for the future. Trees cool our neighborhoods, clean our air, heal our minds and bodies, and even boost local economies.

When we talk about planting trees, we're not just talking about landscaping a garden for aesthetics, we're talking about building a healthier, more livable community. The urban forest is made up of all the trees and green spaces in and around our communities. It's one of the most powerful tools we have to address the growing challenges that Texas cities face from declining community health, extreme heat, to flooding, and poor air quality.

The urban forest plays a critical role in creating cooler, more vibrant communities. Trees reduce urban heat, improve public health, support wildlife, and enhance our quality of life. Despite the significant benefits trees provide, many Texas communities lack the resources or guidance to build and maintain strong urban forestry programs. This report is designed to help fill that gap.

Inside this report, you'll find:

- Project's goals and their importance for cities across Texas
- Why urban forests matter and what benefit they bring to communities
- How to use the tool to plan high-impact tree planting projects
- Where to start planting in your community
- How local governments, community groups, and residents can get involved
- Available resources to support next steps from technical help to funding opportunities

Whether you are reading this report as a policymaker, a greening professional, or a community advocate, the purpose is the same: to give your city a clear, flexible roadmap to plant wisely, plan strategically, and grow a stronger future one tree at a time. It's the first step in a bigger journey towards a cooler, healthier, and greener Texas for all.


VOLUNTEER
LENNOX

Value of the Urban Forest

"The creation of a thousand forests is in one acorn." – Ralph Waldo Emerson

The Geospatial Analysis 65 project is about planting smarter. It gives each community a tailored, easy-to-use tool that identifies where trees are needed most and where they can do the most to cool neighborhoods, improve public health, boost local economies, and bring the beauty of nature back to the places people live, work, and play.

This effort is guided by four key goals that together aim to strengthen and sustain urban tree canopy growth across Texas cities:

- Empower communities with actionable data and insights that support the development of high-impact, locally driven tree planting programs designed to counter the effects of urbanization.
- Introduce a user-friendly planning tool to help municipal staff, decision-makers, and partners make strategic, evidence-based choices about where and why to plant trees.
- Increase public awareness and encouraging community involvement so that residents, local leaders, and organizations can take part in creating and maintaining healthier urban forests.
- Build lasting partnerships between cities, the Texas Trees Foundation, Texas A&M Forest Service, and other collaborators to ensure that these greening efforts extend well beyond the scope of this report.

Tackling Today's Urban Challenges

As cities grow and temperatures rise, many communities across Texas are facing hotter summers, increased pollution, and more strain on local resources. Trees directly address these problems by cooling our neighborhoods, improving air and water quality, and reducing stress on aging infrastructure. The urban forests is essential green infrastructure that benefits every resident every day by providing:

Economic Growth

Trees do more than beautify a neighborhood—they help local economies thrive. Shaded business districts attract more foot traffic and increase retail sales. Homes in tree-lined neighborhoods often have higher property values. Cities also save on infrastructure costs as tree canopy reduces wear on streets and cools surrounding buildings, lowering energy bills and maintenance expenses. Investing in trees is a long-term investment in a city's financial health.

Human Health Benefits

Trees actively contribute to the physical and mental well-being of residents. They reduce air pollution, filter out harmful particulates, and provide cleaner oxygen to breathe. Green spaces lower stress levels, encourage outdoor activity, and offer natural places for social connection. Studies have shown that access to trees and nature can even improve focus and reduce anxiety — especially in children and older adults. In short, trees make our communities healthier and happier.

Environmental Benefits

The environmental value of trees can't be overstated. Trees cool our cities by reducing the urban heat island effect, provide habitat for wildlife, and increase local biodiversity. They intercept stormwater, help prevent flooding and improve water quality. Trees also sequester carbon and remove pollutants from the air, playing a critical role in climate change mitigation. As cities across Texas face hotter summers and more extreme weather, growing the urban forest is one of the best ways to build resilience for the future.

Value of Urban Forests

Human Health Benefits
Trees actively contribute to the physical and mental well- being of residents.

Economic Growth
Trees do more than beautify a neighborhood—they help local economies thrive.

Environmental Benefits
Trees cool our cities by reducing the urban heat island effect, provide habitat for wildlife, and increase local biodiversity.

Turning Data Into Action: How to Use the Tool

"Planting trees provides both immediate and long-term health benefits to residents by reducing the temperature up to 15 degrees, helping people better enjoy the outdoors in many of Texas' warmer months."

– Eric Wettengel, Urban Forestry Manager

The Geospatial Analysis 65 tool is designed to make tree planting more strategic and more impactful for communities of all sizes. Whether you're a seasoned urban forester or a community advocate with limited experience in tree planning, this tool gives you a roadmap to plant smarter for the greatest impact.

Geospatial Analysis 65 software works through three main functions: View, Plan, and Grow, each offering a different lens to help you understand your communities' needs and opportunities.

The Three Functions

View Tool: This feature shows the current land cover across your community. You'll see where trees already exist, where they could be added, and which areas have the most potential for planting. It's a great place to start understanding your urban forest from the ground up.

Plan Tool: This view combines tree cover data with socioeconomic factors like income levels, health indicators, and population density. It highlights areas where planting trees would provide the greatest benefits in underserved neighborhoods that need it most.

Grow Tool: Once you know where to plant, the Grow tool helps you model realistic canopy growth scenarios over time. You can set targets and explore how different planting strategies would impact your communities' tree canopy over the next decade and beyond.

Together, these three functions give you a powerful, flexible framework to guide your planning and decision making. But to get the most out of it, having a goal in mind from the beginning is helpful. For more information and an in-depth tutorial on how to use each tool, please visit: [LINK TO TUTORIAL]

Maximizing Impact

Set a Clear Goal

Before you get your shovels out, define what success looks like for you and your community. Do you want to reduce heat in high-risk neighborhoods? Improve walkability downtown? Reach a specific canopy percentage by a certain year? A clear goal helps you use the tool more effectively and makes it easier to track your progress over time. Several goal-oriented maps are available at the end of this report to help.

Identify Your Priority Areas

The tool can help you zoom in on specific communities and neighborhoods. Focus your attention on areas that combine high-need and high-opportunity places where planting trees will have the greatest environmental, health, and social benefits.

Start Small, Think Big

Even planting a few dozen trees a year can begin to shift your city's canopy. Set achievable annual targets, like planting 50 trees or even just one for Arbor Day and build momentum from there. These early efforts lay the groundwork for bigger, more ambitious projects down the road. It's great to have bold, inspiring goals, but it's also okay to be realistic about your community's resources. The best strategies balance vision and practicality.

Keep the Long-Term Vision in Sight

Urban forests aren't grown overnight. Use this tool to work toward a long-term canopy goal such as increasing tree cover by 5%, 10%, or more over 10 years. This kind of steady, long-term planning makes your urban forest more sustainable and impactful.

With your urban canopy goal set, it's time to take the first steps toward a greener future. Every tree planted brings you closer to a cooler, healthier, and more connected community. The next section will offer recommendations on where and how to get started.

Canopy of Assessment Methodology

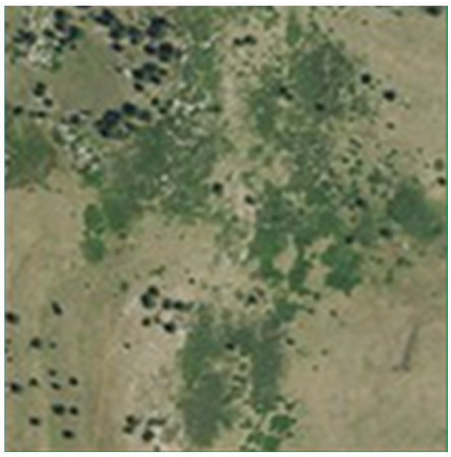
Tree canopy and related metrics were analyzed across the city limits and census block groups. For municipalities smaller than five square miles, a grid of 1,000 equally sized hexagons was distributed and assessed across the City.

Ranging (LiDAR) data. LiDAR works by sending laser beams from a satellite to the ground. The time it takes for these lasers to bounce back to This study focused on tree canopy cover, which was identified by a machine learning algorithm that leveraged Light Detection and Ranging (LiDAR) data. LiDAR works by sending laser beams from a satellite to the ground. The time it takes for these lasers to bounce back to the satellite is used to measure the heights of trees. This methodology was used to set a minimum height of 10-12 feet for classification as tree canopy, ensuring that shrubs and shorter vegetation were not included in final tree canopy summaries.

To identify areas suitable for planting trees, referred to as possible planting areas (PPA), all pixels without existing tree canopy were classified as either plantable or unsuitable for planting. Unsuitable areas, such as recreational playing fields and major utility corridors, were manually outlined and combined with non-plantable land cover types, such as impervious surfaces and bare soil, which typically suggest ongoing clearing and development, to compile a comprehensive list of locations where tree planting is infeasible. Plantable space was defined as any vegetated area free from existing trees but suitable for future planting.

Tree Canopy

leaves, branches and stems generally greater than 10-15’ tall.



Shrubs

woody plants with multiple stems arising from the base generally less than 10’ tall

Other Vegetation

healthy grasses, herbaceous plants, open pastures and turf grass

Bare Soil and Dry Vegetation

exposed earth, sand, or dead/dormant grasses

Impervious Surfaces

roads, sidewalks, parking lots, buildings and other paved areas

Water

rivers, lakes, reservoirs, and wetlands

Figure 7. Landcover classes identified in 2022 imagery

City Recommendations

"The best time to plant a tree is twenty years ago, the second best time is now." – Chinese proverb

Freeport

Freeport is located in Southeast Texas, within the Western Gulf Coastal Plain ecoregion, characterized by flat terrain, high humidity, and proximity to coastal environments. The city experiences hot summers, occasional flooding, and salt spray exposure, which influence tree species selection and urban forest health. Freeport's current urban tree canopy coverage is approximately 11%, with opportunities to increase shade and green infrastructure in public parks and along waterfront areas.

Expanding the urban canopy in Freeport can improve heat reduction, stormwater management, erosion control, and public enjoyment of outdoor spaces. The maps in the Appendix show priority areas for tree planting.

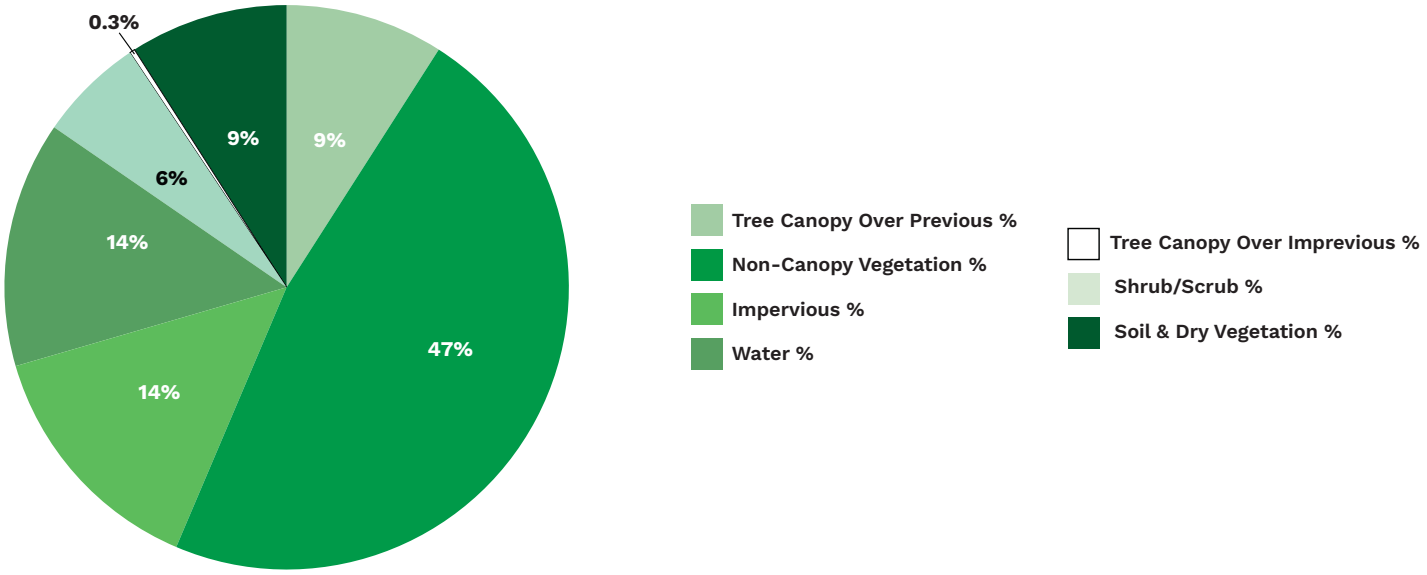


Figure 2. This illustrates the land cover composition of Freeport based on imagery from 2022. TreePlotter CANOPY provides a more detailed assessment segmented by additional assessment.

City Statistics

TREE CANOPY COVER (2022)

1,049
Acres

11%
of Land Area

POSSIBLE PLANTING AREA (2022)

5,826
Acres

60%
of Land Area

CANOPY CHANGE (2016 - 2022)

337
Acres Increase

3.5%
Increase

Recommended Planting Locations

Arrington Park

This neighborhood park offers open green spaces with limited tree canopy. Planting shade trees along walking paths, picnic areas, and near playgrounds would enhance visitor comfort, encourage longer stays, and support community gatherings.

Figure 4. Arrington Park

Austin Park

Serving as a central recreation area, Austin Park hosts sports fields and playgrounds but lacks consistent shading. Strategic planting around athletic fields, spectator seating, and parking lots would provide much-needed relief during warm months and improve aesthetics.

Figure 5. Austin Park

Riverside Park

Situated adjacent to the Brazos River, Riverside Park presents unique opportunities for riparian buffer planting. Expanding tree canopy along trails, riverbanks, and picnic areas would aid in erosion control, create wildlife habitat, and offer shaded respite for park users.

Figure 6. Riverside Park

Recommended Tree Species

The following species are well adapted to Freeport's coastal environment and urban settings:

Bur Oak *(Quercus macrocarpa)* – Large, tough oak with deep roots and strong wind resistance.

Cedar Elm *(Ulmus crassifolia)* – Hardy and adaptable, tolerating urban stresses and salt spray.

Bald Cypress *(Taxodium distichum)* – Deciduous conifer ideal for wet or flood-prone areas.

Texas Redbud *(Cercis canadensis var. texensis)* – Small flowering tree offering seasonal color and habitat benefits.

Mobilizing Your Planting Plan

"Until you dig a hole, you plant a tree, you water it and make it survive, you haven't done a thing." – Wangari Maathai

Creating a healthier, greener community is a team effort and there's a role for everyone. Whether you are working inside your local government, part of a local nonprofit, or a community member who wants to make a difference, the Geospatial Analysis 65 project is designed to support your next steps. This section outlines how different types of leaders and partners can turn a desire for more greening into a planting plan.

Policy Makers

Local governments have the greatest potential to make systemic changes within the communities they serve. If you're a mayor, city manager, councilperson, planner, or parks director, consider:

- Using this report to inform your capital improvement or parks master plan.
- Setting measurable goals for tree planting (e.g., X trees per year or % increase in canopy by 2035).
- Establishing or strengthening your tree ordinance, tree board, or green infrastructure policy.
- Applying for grants and seeking funding partnerships with local businesses and nonprofits.
- Adding trees on school campuses to support education, health, and student well-being.

Nonprofits

Nonprofits and community organizations, such as the local Rotary club or Master Gardener chapter, are essential partners in outreach, funding, and implementation. You can:

- Use the report to identify high-need areas for future project locations.
- Apply for grants using canopy data and priority rankings as support.
- Recruit and train volunteers, especially for planting and tree care efforts.
- Serve as the bridge between local government and residents, translating policy into people-powered action.

Community Members or Volunteers

You don't need to be an expert to make a difference. Members of the community and volunteers are the heart of any successful planting effort. Whether you have time for one afternoon or want to join a long-term, tree planting team, you can:

- Learn about your community's canopy needs using this report.
- Attend public meetings and advocate for more tree planting, especially if you live in a community that would benefit from additional trees.
- Start a neighborhood greening committee or host a block tree walk.
- Reach out to your city council or parks department and ask how you can help support the urban forest and the community's planting goals.
- Help spread the word on social media or in community forums.
- Join tree giveaways, planting days, or youth education programs.

No matter what your role is, your participation matters. Planting trees is one of the simplest, most visible, and most meaningful ways to contribute to the health and future of your community. This report gives you the data, now it's up to all of us to bring it to life. The next section will provide you with a good starting point when looking for resources to support your tree planting efforts.

Resources

Now that you've explored your community report, established goals, and identified key planting opportunities, you're ready to take the next step. The good news is you're not in this alone. Across Texas, there are people, programs, and partnerships ready to support you in bringing your tree planting plan to life. Below is a list of resources and organizations to help guide, fund, and grow your efforts.

Building a Tree Planting Culture

Urban forestry isn't just about planting trees, it's about creating a culture that celebrates and sustains the urban canopy effort. An easy framework to use when getting started is looking at what it takes to become a Tree City USA. This national program run by the Arbor Day Foundation has four requirements that get a community set up for long-term success in their greening efforts and creates avenues for community members to get involved.

Establish a Tree Board

One way to get involved is by organizing or, if your community already has one, participating on a tree board. It can be made up of municipal staff, community members, or a mix of both and serves as the guiding body for your community's urban forestry efforts. A well-educated and organized tree board can be a massive force for change in your community to get trees planted and grow your urban forest.

Create a Tree Ordinance

A tree ordinance doesn't have to be complicated; it just needs to provide clear direction on how your community plants, maintains, and protects public trees. This shows long-term commitment and creates a structure for how decisions are made. The ordinance might cover topics like approved species lists, how trees are managed during construction, or who is responsible for tree care on city property. Ask your community members what goals they would like to see for their urban canopy and create your ordinance from there.

Spend at Least $2 Per Resident on Urban Forestry

This requirement may seem a little daunting, but most communities are already doing without even knowing it. The $2 per capita can come from city budgets, grants, or even in-kind contributions like volunteer hours or donated equipment. It can be used for tree planting, pruning, maintenance, educational programs, or professional development for staff. If you are particularly skilled with numbers, helping your municipal leaders track down these dollars in the community budget will be a huge help.

Host an Annual Tree Planting

This is the fun part. Host an annual tree planting event in your community commemorating Arbor Day. Organizing a tree planting is one of the most effective ways to get involved in your community's greening efforts. This annual event is a great way to get the whole community involved and invested in increasing the urban canopy and can easily be anchored to days you may already celebrate like:

Texas Arbor Day – November

While National Arbor Day is held in April, Texas celebrates Arbor Day in November, when cooler temperatures make it a better time to plant across most of the state. Hosting your event in the fall helps ensure tree survival and boosts community turnout.

National Arbor Day – April

In some regions of Texas (especially the Panhandle and East Texas), late April can still

be suitable for planting. National Arbor Day can also be a moment to highlight progress, announce future plans, or simply raise awareness even if trees aren't going into the ground.

Community Celebrations

The best time of year to plant trees in Texas is in the fall, between the months of October and December. If your community already has an annual Fall Festival or local celebration, incorporating a tree planting enhances the event with another fun, outdoor activity.

Time for a New Holiday!

If none of the above work for you, no time like the present to make a new day to celebrate. Use a tree planting event to anchor a new day of service, farmers market, or fair day for family fun.

For additional guidance, technical support, or help starting this process, reach out to your regional Texas A&M Forest Service urban forester or connect with partners like the Texas Trees Foundation. You can also find more information at: *arborday.org/our-work/tree-city-usa*

Your Support Network

Texas A&M Forest Service (TFS)

The Texas A&M Forest Service is a statewide leader in urban and community forestry. Through their network of Regional Urban Foresters, TFS offers technical support, strategic planning assistance, and grant opportunities. Connect with your regional forester to explore how your community can put this report into action.

Texas Trees Foundation (TTF)

TTF is your partner in transforming this report into results. With deep experience in urban forestry planning, community outreach, and implementation, we're here to help cities build capacity and momentum. Reach out for advice, ideas, or collaboration on planting projects.

Texas A&M AgriLife Extension

The AgriLife Extension Service provides trusted, science-based environmental information to Texas communities. Your local county office can offer resources on tree selection, planting techniques, and landscape management, and they're always happy to help connect people and ideas.

Regional Urban Forestry Councils

Groups like the Cross Timbers Urban Forestry Council or the Bexar Branches Alliance bring together professionals, nonprofits, and community leaders focused on regional greening efforts. They're great for networking, idea sharing, and even regional volunteer coordination.

ISA Certification and Training Opportunities

If your team wants to build internal capacity, the International Society of Arboriculture (ISA) offers credentialing for tree professionals. Virtual courses and collaborative certification programs can help grow your community expertise from the inside out.

Tree City USA Framework/Arbor Day Foundation

Becoming a Tree City USA is a great way to formalize your community's commitment to urban forestry. The program provides a step-by-step framework to help your community build a sustainable, long-term tree management strategy.

Whether you're planning your first planting or setting a 10-year canopy goal, these partners and tools are here to help. Building an urban forest takes time, but with the right people, plans, and passion, your community can grow something lasting. Time to get started.

Conclusion

“He who plants a tree, plants hope.” – Lucy Larcom

With this report in hand, your community has a clear, data-backed path toward a greener, healthier, more resilient future. We invite you to share this report with others in your community, joining together in action with shared purpose.

The Texas A&M Forest Service and the Texas Trees Foundation are here to support you every step of the way. From technical guidance to community engagement ideas, we’re happy to talk, brainstorm, or walk you through next steps. Your regional TFS urban forester is a great first contact, someone who knows your region and can help you tailor your approach. Our team at TTF is also just an email or call away, ready to partner with you in growing something great.

If you’re ready to plant, we’re ready to help.

To find your local Texas A&M Forest Service forester:
tfsweb.tamu.edu/directory/

To contact a Texas Trees Foundation forester:
texastrees.org/contact/

Tree Planting Checklist

1. Define Your Vision

- ○ Identify the goal (beautification, shade, stormwater management, public health, etc.).
- ○ Use the Geospatial Analysis Tool to identify high-impact planting zones.
- ○ Choose the target area (parks, schoolyards, streets, neighborhoods).
- ○ Determine how many trees you want to plant (nothing wrong with starting small).

2. Engage Partners and Stakeholders

- ○ Contact your Regional TFS Urban Forester for support and guidance.
- ○ Reach out to Texas Trees Foundation for technical assistance, collaboration, and help in fundraising.
- ○ Identify local partners: government officials, nonprofits, schools, neighborhood groups.
- ○ Engage landowners or municipal departments for necessary permissions.

3. Assess and Plan the Site

- ○ Conduct a site assessment (sunlight, soil, spacing, overhead wires, irrigation, topography).
- ○ Determine the size and species of trees appropriate for the site.
- ○ Consider future maintenance and growth (trees grow, plan for the long term).

4. Select the Right Tree(s)

- ○ Choose native or well-adapted species suitable for the region and site.
- ○ Ensure species diversity to protect against pests and disease (10, 20, 30 rule for guidance).
- ○ Consult local experts or extension services for guidance.

5. Prepare the Budget and Secure Funding

- ○ Estimate costs: trees, tools, mulch, watering, signage, staff/volunteers.
- ○ Apply for local, state, or nonprofit grants (from TFS, TTF, etc.).
- ○ Seek donations or sponsorships from businesses or community organizations.

6. Organize the Planting Event

- ○ Choose the date (ideally fall in Texas).
- ○ Recruit volunteers and/or municipal staff.
- ○ Assign roles (planting leaders, logistics, water crew, check-in, education).
- ○ Gather materials: shovels, gloves, mulch, water, tree stakes, signage.
- ○ Call 811 to check for underground utilities before digging.

7. Plant the Trees

- ○ Dig holes prior to event, especially if planting large trees (this is a great way to retain volunteers).
- ○ Follow best planting practices (proper hole depth, root flare visibility, etc).
- ○ Add mulch in a donut shape, not a volcano.
- ○ Stake trees only if necessary, avoid guying, and remove stakes within one year.
- ○ Water deeply after planting.

8. Celebrate and Educate

- ○ Take photos, invite media, and share on social media.
- ○ Thank volunteers, funders, and partners.
- ○ Add educational signage or provide tree care info to residents.

9. Maintain and Monitor

- ○ Set up a watering schedule for at least the first 2–3 years to let the trees get established.
- ○ Check for pests, disease, or damage.
- ○ Prune for structure once trees are established in 2-3 years (never top or over-prune).
- ○ Track survival and growth rates if possible.

10. Build a Long-Term Culture

- ○ Plan for annual tree plantings tied to Texas or National Arbor Day or local event.
- ○ Consider creating a Tree Board or pursuing Tree City USA status.
- ○ Educate the community on tree benefits and urban forestry efforts.

Want help getting started? Reach out to your TFS Regional Forester or the Texas Trees Foundation. We're here to help you grow your project from idea to impact.

Report Prepared By:

Texas A&M Forest Services

Mission: provide statewide leadership and technical assistance to ensure trees, forests and related natural resources are sustained for the benefit of all. The agency supports the state's incident response capability, protecting against wildfire and responding to a range of all-hazard incidents.

Texas Trees Foundation

The Texas Trees Foundation, a nationally recognized nonprofit, transforms communities by maximizing the benefits of trees to support human health. Through education, scientific research, and evidence-based design, Texas Trees is advancing urban forestry to reimagine our cities into greener, cleaner, cooler and healthier places to grow and thrive. For more information on Texas Trees and its impact, visit www.texastrees.org, Instagram, Facebook, LinkedIn, and X.

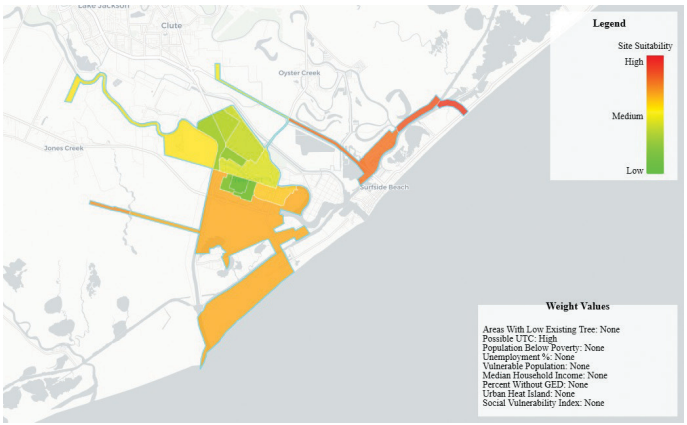
Data provided by PlanIT Geo


LENNOX
HUSKY

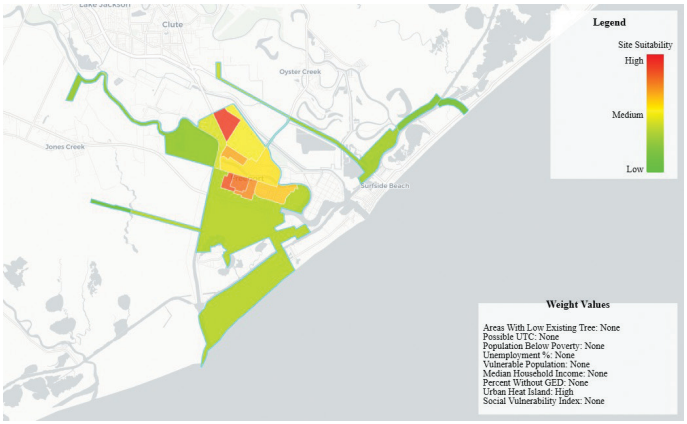
Appendices

Goal-oriented planting maps

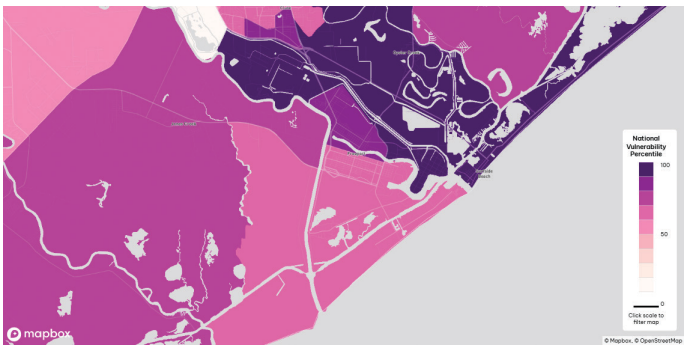
Depending on the needs and goals of a community, tree planting can be prioritized in different areas within your community. Below are maps provided to guide you in tree planting efforts for maximizing carbon sequestration, reducing air pollution and urban heat, increasing human health, managing stormwater run-off and water quality.



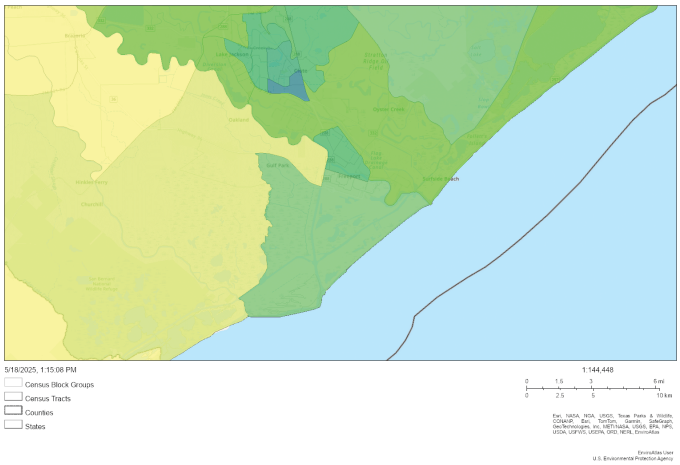
Priority Sites (Carbon storage)



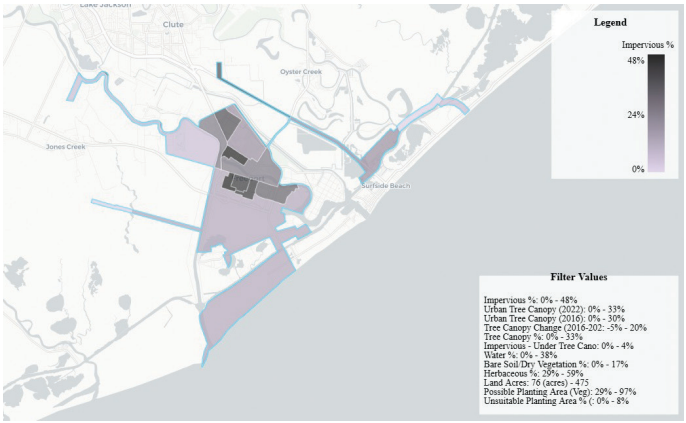
Urban Heat



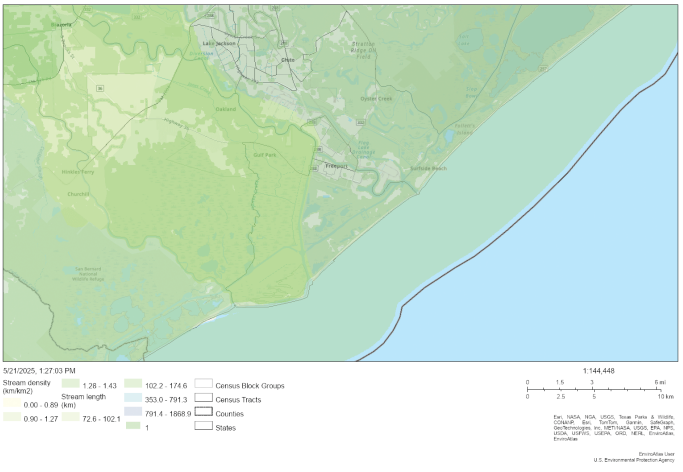
Human Health



Air Quality



Stormwater runoff



Water quality

Background of Analysis

The current tree canopy was assessed using 60-centimeter resolution aerial imagery from the USDA's National Agriculture Imagery Program (NAIP) from 2022. The imagery was then compared to NAIP imagery from 2016 to determine canopy change over a six-year period. To classify the land into different categories, the study applied advanced machine learning, a type of artificial intelligence (AI) where computers are trained to recognize patterns in data. In this case, the machine learning model was trained to identify six different types of land cover - trees, shrubs, low-lying vegetation, bare soil/dry vegetation, impervious surfaces, and water - by analyzing the pixels of the aerial imagery (Figure 1).

Methodology

This interactive mapping tool will allow users to design tree-planting programs focused on equity and environmental impact. Key planting locations can be identified based on multiple factors, such as income and unemployment rates, areas that have experienced tree loss, and regions with above-average surface temperatures. Detailed socioeconomic data is available to assist with site prioritization. These insights will help refine or formulate canopy goals, policies, ordinances, and management practices to address disparities and increase its tree canopy. By understanding the current tree canopy, recent changes, and the potential for growth, collaborative efforts can enhance your urban forest, ensuring a greener, healthier future for all residents. Each census block group (CBG) was evaluated and ranked according to its specific needs, with rankings represented by a color gradient ranging from dark green (indicating highest need) to light green (indicating lowest priority) in Figure 3.

Prioritization Criteria Definitions

CDC Social Vulnerability Index (SVI): Created by the CDC and Agency for Toxic Substances and Disease Registry (ATSDR), the SVI identifies communities needing extra support during crises like natural disasters or disease outbreaks. It measures how external stressors impact community health, aiming to reduce inequalities.

Landsat thermal data from summer 2024 was used to calculate average surface temperatures (°F) for each census block group.

Low Tree Canopy: This layer shows the existing urban tree canopy and areas without tree cover.

Possible Tree Canopy: Displays the percentage of land available for future tree planting.

Median Household Income: Shows income levels from U.S. Census data. Tree cover correlates with increased economic vitality and quality of life.

Poverty Rate: Indicates the percentage of residents living below the poverty level, based on U.S. Census data. Tree canopy tends to be higher in wealthier areas.

Unemployment Rate: The percentage of the labor force without a job, actively seeking employment. It does not distinguish between unemployed and retired individuals.

Dependency Ratio: A measure comparing vulnerable populations (those under 18 or over 65) to the working-age population (ages 18 to 65).

Educational Attainment: The percentage of the population without a high school diploma or GED.